

REMARKS

I. Introduction

In response to the Office Action dated May 27, 2009, Applicants have amended claims 1 and 9 in order to further clarify the subject matter of the present disclosure. Support for the amendment to claim 1 may be found, for example, in original claims 4 and 9. In addition, claim 4 has been cancelled, without prejudice. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 1-16 Under 35 U.S.C. § 103

Claims 1-10, 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki et al. (US 2002/0037450) in view of Delnick (USP No. 5,948,464); claim 11 as being unpatentable over Suzuki in view of Delnick and further in view of Ota et al. (USP No. 6,365,300); claim 12 as being unpatentable over Suzuki in view of Delnick and further in view of Hampden-Smith et al. (US 2002/0168570); and claims 15-16 as being unpatentable over Suzuki in view of Delnick and further in view of Daroux et al. (USP No. 6,562,511). Applicants respectfully submit that Delnick, Suzuki, Ota, Hampden-Smith and Daroux fail to render the pending claims obvious for at least the following reasons.

With regard to the present disclosure, amended independent claim 1 recites, in part, a lithium ion secondary battery having a porous film comprises an inorganic filler being alkaline on a surface thereof and a first binder, a content of the first binder in the porous film being 1.5 to 8 parts by weight per 100 parts by weight of the filler, the first binder comprises a first rubber comprising core-shell type particles of acrylonitrile-acrylate copolymer, the acrylate forming an

acidic adhesive surface portion on a surface of the core-shell type particles, the first rubber being water-insoluble and having a decomposition temperature of 250°C or higher.

One feature of the present disclosure is the use of a binder comprising core-shell type particles of acrylonitrile-acrylate copolymer. The binder partially comprises the porous film for the lithium ion secondary battery.

It is admitted that Delnick fails to disclose the claimed first binder of claim 1. However, it is alleged that Suzuki discloses core-shell type rubber particle comprising an acrylonitrile unit in a positive electrode. As such, it is alleged that the combination of Delnick and Suzuki teach or suggest the limitations of claim 1. Applicants respectfully disagree.

One skilled in the art would use different binders for the positive and negative electrodes in a lithium ion battery in order to avoid red-ox reactions in the respective electrodes.

Usually, the stability of a resin derived from Molecular Orbital method (HOMO/LUMO) is used as an indicator. Based on such indicator, generally, single component resins or a combination thereof (copolymer) is selected. Therefore, rubber including a polyacrylonitrile chain, which is unstable under the negative electrode potential, is hardly selected, from a conventional viewpoint (see, pages 18-19 of the present disclosure). As such, one skilled in the art would not have used a core-shell type rubber particle positive electrode binder including an acrylonitrile unit disclosed by Suzuki as a resin material to be bonded to a negative electrode. Moreover, Suzuki merely discloses using a core-shell type rubber particle as a binder for the positive electrode and does not suggest using it as a binder for the separator. As such, it is clear that Delnick and Suzuki do not teach or suggest a binder comprising core-shell type particles of acrylonitrile-acrylate copolymer. Moreover, Hampden-Smith, Ota, and Daroux do not, and are not relied upon to remedy this deficiency.

In addition, claim 1 also recites a core-shell type rubber particles having an acidic adhesive surface portion, the inorganic filler being alkaline on a surface thereof. As is recited in the present specification, it is known that when a filler having an alkaline site on the surface thereof and a polymer having an acidic group are mixed, the acidic group of the polymer makes bonding with the alkaline site of the filler. As such, the acidic group of a polymer combines with the alkaline site of a filler.

Usually, core-shell type rubber particles that have acidic groups on their surface cause a decrease in battery performance, because the acidic groups capture lithium ions. However, when used in combination with an alkaline filler, the acidic groups are neutralized and do not suppress performance of the battery due to lithium ion capture.

In contrast, Delnick, Suzuki, Hampden-Smith and Daroux do not disclose the above-mentioned feature.

Therefore, as is well known, in order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. As Delnick, Suzuki, Ota, Hampden-Smith and Daroux do not disclose a portable power source comprising a battery pack housing at least one secondary battery, wherein said battery pack includes external terminal inserting portions for inserting a pair of external terminals, a first internal terminal and a second internal terminal for connecting to said pair of external terminals are provided inside said battery pack, said pair of external terminals is connected to said first internal terminal and said second internal terminal when two or more operations in different operating directions are completed, and said two or more operations include at least a rotation operation, it is apparent that Delnick, Suzuki, Ota, Hampden-Smith and Daroux fail to render amended claim 1 or any

dependent claims thereon obvious. Accordingly, the Applicants respectfully request that the § 103 rejection be withdrawn.

III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as amended claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

IV. Conclusion


Having responded to all open issues set forth in the Office Action, it is respectfully submitted that all claims are in condition for allowance.

Application No.: 10/568,536

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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